HPMS 2010+
Field Manual Rollout

FHWA Spring Webinar Conference Series

Webinar #1

March 8, 2010

Housekeeping

- Please mute your phone during the presentation
- Use the chat box to enter questions/comments
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Field Manual Synopsis

- Referenced Material:
  - Field Manual ’05, Field Manual ‘08 (draft)
  - Data Specifications Document ‘09
  - Spring ‘09 Webinar Conference
- Structure
  - 7 Chapters
  - 10 Appendices
  - Diagrams, Figures, Reference Tables

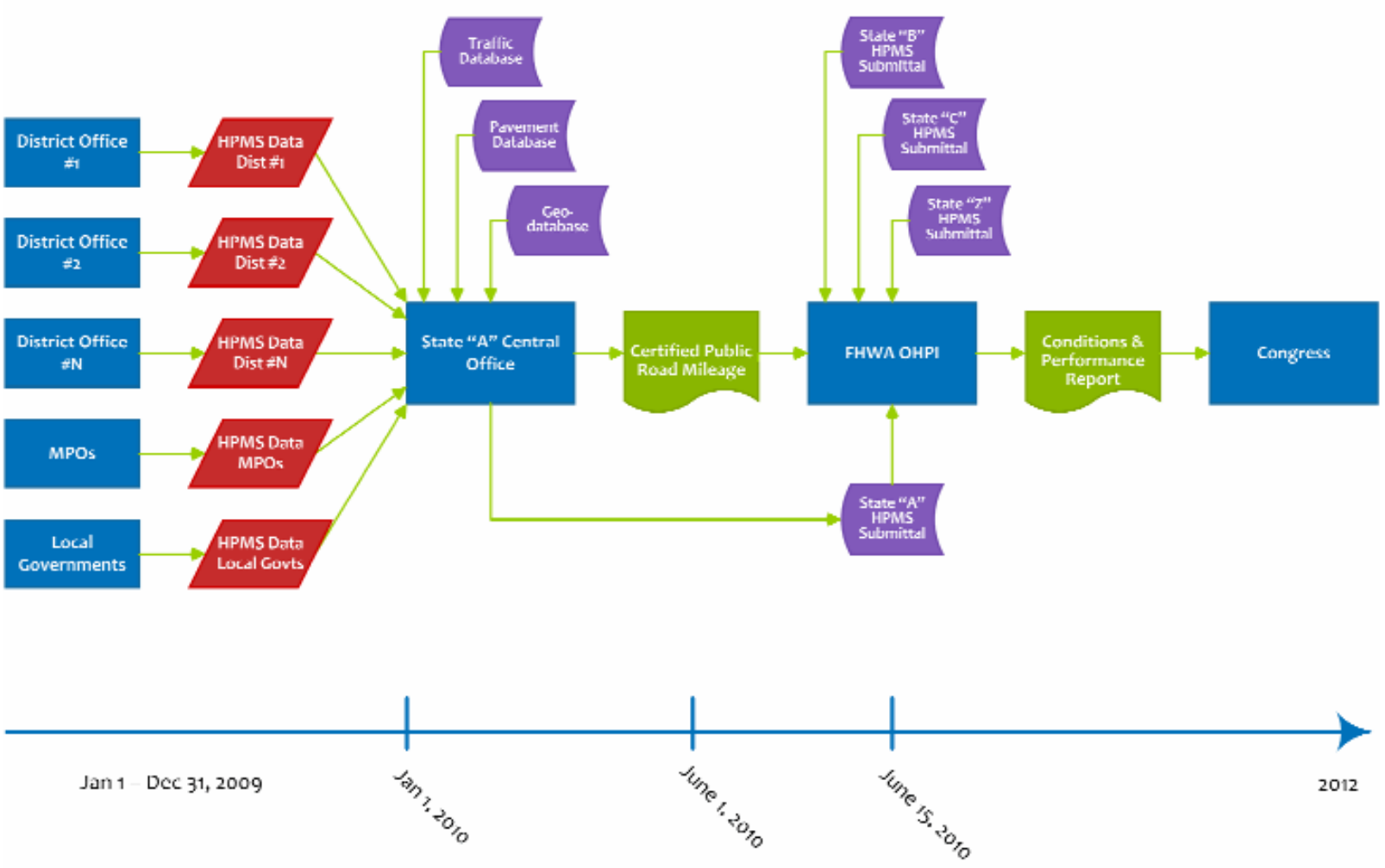
Chapters

1. Introduction
2. HPMS Core Components
3. Data Model and Required Datasets
4. Data Requirements and Specifications
5. Guidance on Special Topics
6. Sampling
7. Submittal Process

Chapter I: Introduction

- Background
- Scope of the HPMS
- Uses of the HPMS Data
- HPMS Staff Roles and Responsibilities
- Reporting Requirements

Figure 1.1: State HPMS Processing Cycle



Chapter II: HPMS Core Components

- Full Extent Data
- Sample Panel Data
- Data Items to be Reported
- Summary Data
- Estimates Data
- Metadata

Full Extent / Sample Panel Data Discussion

2.2 Full Extent Data

Within the context of the HPMS system, some data elements must be reported for their full extent (i.e. system-wide). The Full Extent network consists of the National Highway System (NHS) routes (including intermodal connectors) and all other roads, excluding those functionally classified as local or, rural minor collector. Data elements that are reported for these types of roads are referred to as Full Extent data items. For some data items, the Full Extent's coverage also includes ramps associated with grade-separated interchanges for which a limited number of Full Extent data items are to be reported.

2.3 Sample Panel Data

Within the extent of all Federal-aid eligible roads, a random selection of roadway sections is used to represent various attributes at a system-wide level for the purposes of assessing the performance and condition of the network. This process helps to reduce any burden that may be imposed on the States to perform data collection to meet their HPMS reporting requirements. These sections of the network are referred to as Sample Panel sections. Moreover, the Sample Panel sections are selected randomly and are intended to give a statistically valid representation of the State's road network. Due to the structure of the HPMS data model (discussed in Chapter 3), the States are not required to extract the Sample Panel data items, as long as the data in their submittal covers the Sample Panel. States are encouraged to submit their entire dataset for each data item. FHWA will dynamically assign values to the Sample Panel sections, using the data provided by the States. This should help to lessen the data processing burden on States that are currently collecting more than the minimum coverage. Additional information on the Sample selection process is provided in Chapter 6.

Table 2.1: Data Items to be Reported

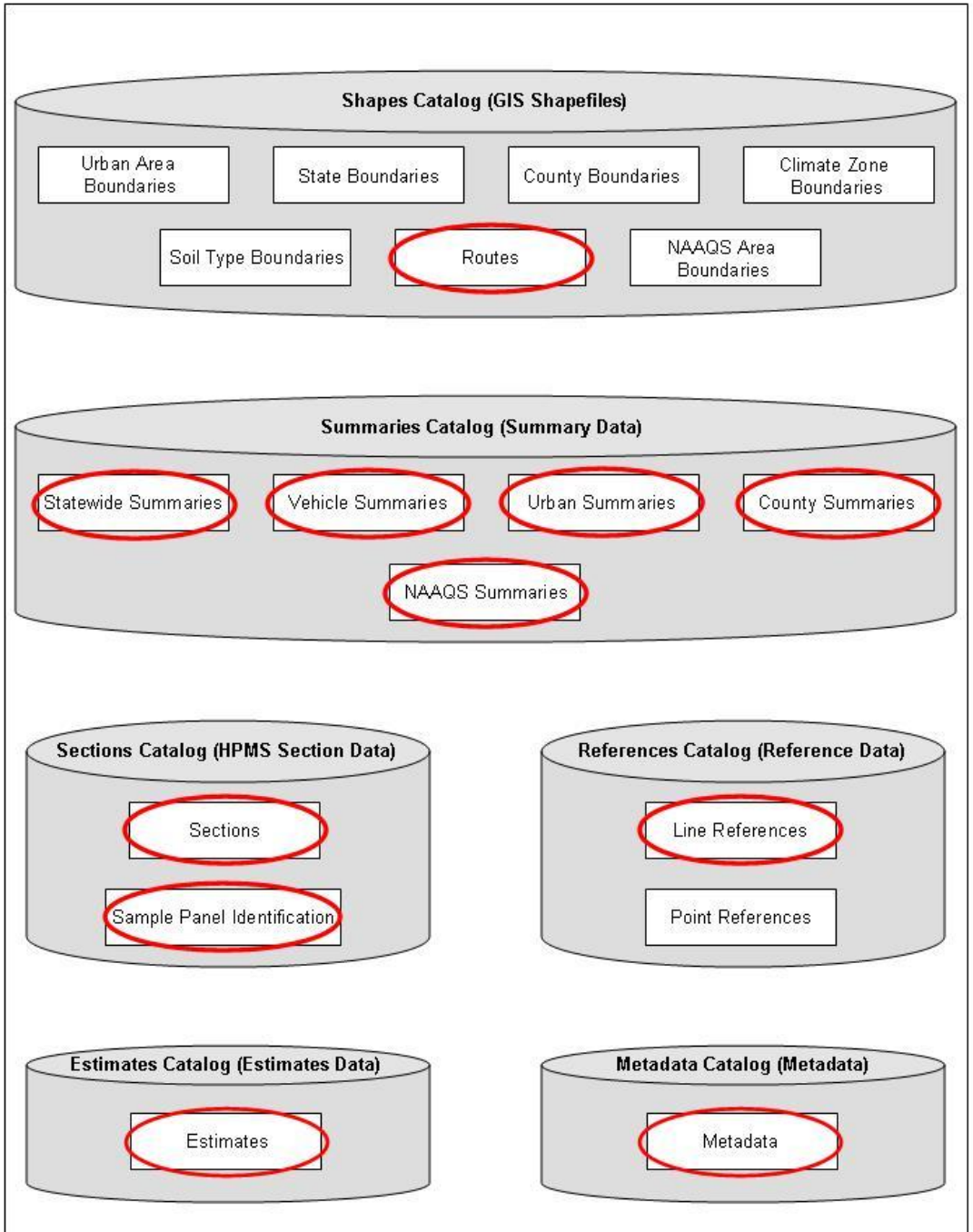
Data Item Type	Item Number	Data Item	Extent	
Inventory	1	Functional (F) System	FE + R	
	2	Urban Code	FE + R	
	3	Facility Type	FE + R	
	4	Is Structure	FE	
	5	Access Control	FE*	SP*
	6	Ownership	FE	
	7	Through Lanes	FE + R	
	8	HOV Type	FE	
	9	HOV Lanes	FE	
	10	Peak Lanes		SP
	11	Lanes		SP
	12	Turn Lanes – Right		SP
	13	Turn Lanes – Left		SP
	14	Speed Limit		SP
	15	Toll Charged + Toll Id	FE	
	16	Toll Type	FE	

FE = Full Extent for all functional systems (including State and non-State roadways)
FE* = Full Extent for some functional systems, (see Data Item descriptions for more details)
SP = All Sample Panel Sections (as defined by HPMS)
SP* = Some Sample Panel Sections (see Data Item descriptions for more details)
FE + R = Full Extent including ramps located within grade-separated interchanges

Chapter III: Data Model and Required Datasets

- Overview
- Geospatial Component
- Catalogs and Associated Datasets

Figure 3.1: HPMS Data Model Structure



NAAQS Area Boundaries Dataset Structure

Table 3.7 NAAQS Area Boundaries

Table 3.7 describes the polygon shapes dataset representing the non-attainment and maintenance areas for each State. This dataset will be maintained by FHWA.

The definition of a Maintenance Area is any geographic region of the Unites States previously designated as non-attainment pursuant to the Clean Air Act (CAA) Amendments of 1990 and subsequently re-designated to attainment subject to the requirement to develop a maintenance plan under Section 175A of the CAA, as amended. The national HPMS database is used for tracking travel for air quality assurance purposes in non-attainment and maintenance areas as required by EPA under the 1990 CAA (Section 187) and the Transportation Conformity Rule, 40 CFR parts 51 and 93. More specifically, the database is used primarily for establishing regional transportation-related emissions for transportation conformity purposes. Estimated travel based on these data is used for the calibration and validation of base-year network travel models when required for non-attainment or maintenance areas.

NAAQS AREA BOUNDARIES TABLE			
Constraint	**Field Name**	**Data Type**	**Description**
PK	Year of Record	Numeric(4)	Year for which the data apply
PK	NAAQS Code	Numeric(5)	NAAQS/Urban code
	NAAQS Area Name	Text	NAAQS/Urban name
PK	Pollutant Type	Numeric(1)	Pollutant
	Shape	Geometry	Polygon feature

Chapter IV: Data Requirements and Specs

- Section Data Reporting Requirements
- Section Data Calculation Rules
- Data Item Requirements
- Sample Panel Section Data Reporting Requirements
- FHWA Coded Data Items
- HPMS Software Calculated Data Items

Table 4.1: HPMS Sections File Structure

	Field Number	Field Name
Section	1	Year of Record
	2	State Code
	3	Route ID
	4	Beginning Milepoint
	5	Ending Milepoint
	6	Data Item
	7	Section Length
	8	*Data Item Value*
	9	*Data Item Text*
	10	*Data Item Date*
	11	Comment (optional)

HPMS Sections File Example

2009,41,000100200S00,0,0.75,AADT,0.75,14800,Factored `06 AADT,,
2009,41,000100200S00,0.75,5.32,AADT,4.57,14700,,4/21/2009,
2009,41,000100200S00,0,0.75,IRI,0.75,118,,3/14/2009,
2009,41,000100200S00,0.75,5.32,IRI,4.57,94,,,
2009,41,000100200S00,5.32,5.69,IRI,0.37,66,,4/15/2008,
2009,41,000100200S00,0,0.75,Through_Lanes,0.75,4,,,
2009,41,000100200S00,0.75,5.32,Through_Lanes,4.57,4,Widened in `08,,

Table 4.3: Calculation Method by Data Item

Item Number	Data Item	Method
1	F_System *	No Calculation Required
2	Urban_Code *	No Calculation Required
3	Facility_Type *	No Calculation Required
4	Is_Structure	No Calculation Required
5	Access_Control	Predominance
6	Ownershp	Predominance
7	Through_Lanes *	No Calculation Required
8	HOV_Type	Predominance
9	HOV_Lanes ***	Predominance
10	Peak_Lanes	Predominance
11	Counter_Peak_Lanes	Predominance
12	Turn_Lanes_R	Predominance
13	Turn_Lanes_L	Predominance
14	Speed_Limit	Predominance
15	Toll_Charged	Predominance
16	Toll_Type	Predominance

*Data items must be reported as homogenous sections (used to define the TOPS)
**Values for these data items must be reported for the defined limits of the TOPS
***Sections for this data item must be the same as for Data Item 8
Weighted Averaging may be used if multiple traffic counts are combined to comprise a homogenous section

Section 4.4: Data Item Requirements

Item 1: F_System (Functional System)

Description: The FHWA approved Functional Classification System.

Use: For analysis and mapping of information by functional system.

Extent: All Federal-aid highways including ramps located within grade-separated interchanges.

Functional System		1	2	3	4	5	6	7
	NHS	Int	OFE	OPA	MiA	MaC	MiC	Local
Rural	FE+R	FE+R	FE+R	FE+R	FE+R	FE+R		
Urban	FE+R	FE+R	FE+R	FE+R	FE+R	FE+R	FE+R	

FE + R = Full Extent & Ramps SP = Sample Panel Sections

Coding Requirements for Fields 8, 9, and 10:

Data Item Value: Code the value that represents the FHWA approved functional system. These following codes are to be used for all rural and urban sections:

Code	Description
1	Interstate
2	Principal Arterial – Other Freeways and Expressways
3	Principal Arterial – Other
4	Minor Arterial
5	Major Collector
6	Minor Collector
7	Local

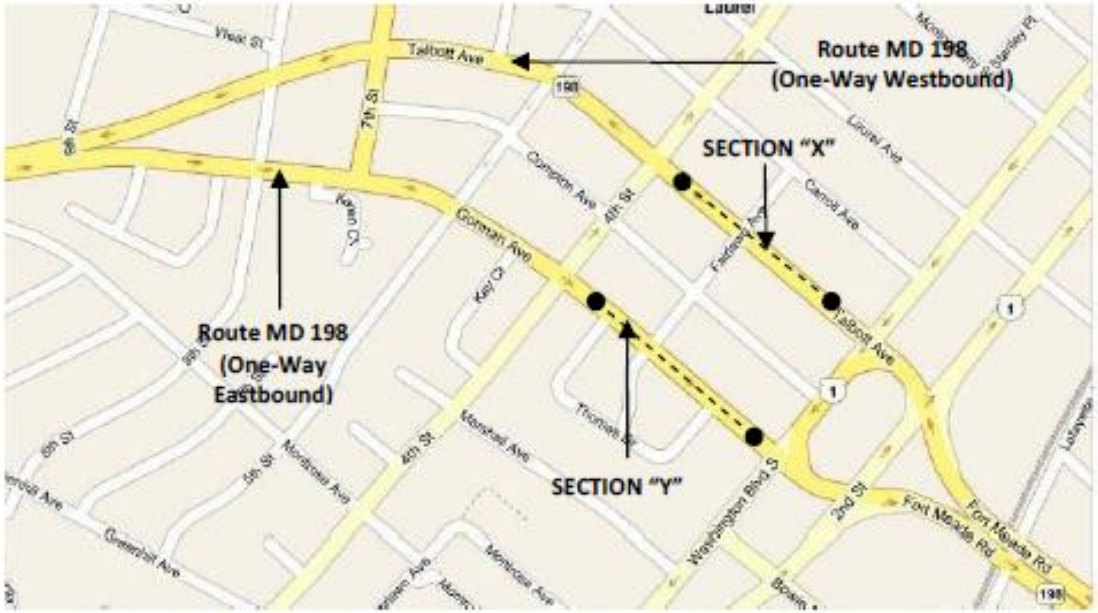
Data Item Text: No entry required. Available for State Use.

Data Item Date: No entry required. Available for State Use.

Guidance for Coding Data Item #3 (Facility Type)

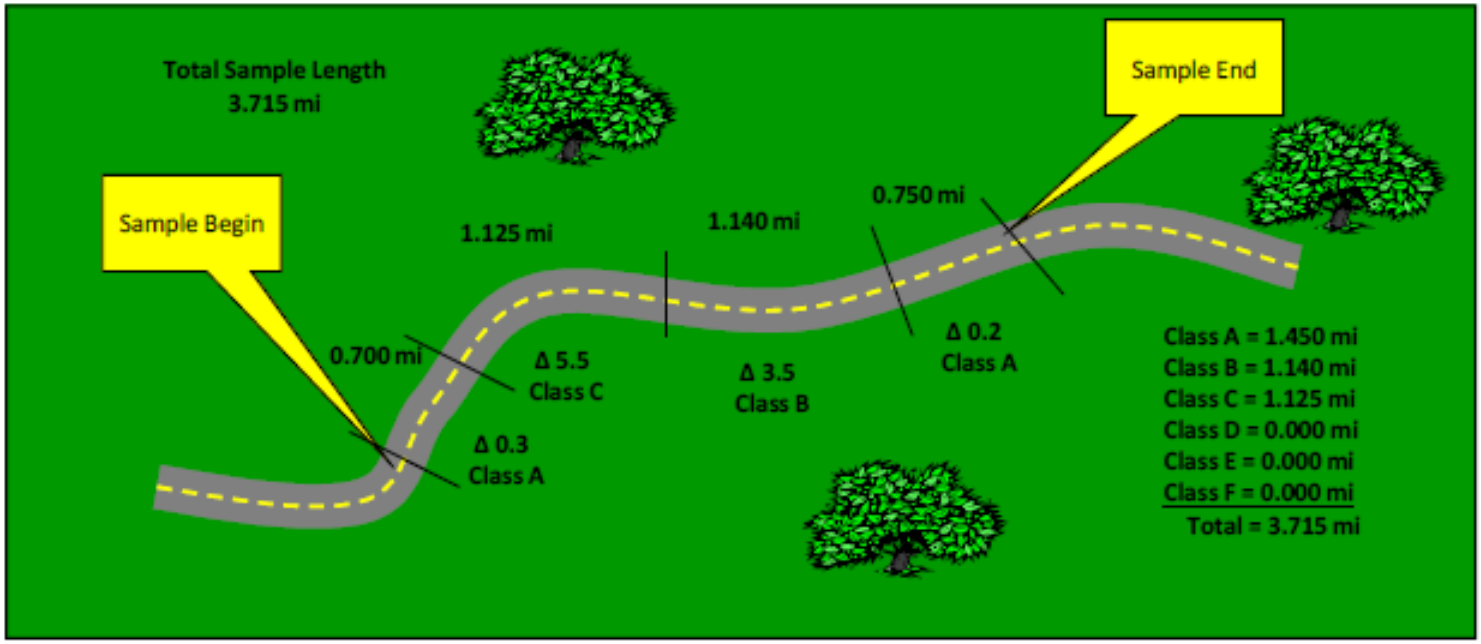
Figure 4.6 shows an example of a street (MD 198), for which traffic moves in the east and westbound directions along a set of one-way pairs (i.e. parallel roadways). In this particular case, this Data Item should be assigned a code "2" for section "X", and a code "3" for section "Y", or vice-versa. Code "2" must be used to identify the roadway's cardinal direction.

Figure 4.6: Couplet (Code "3") Example



Source: Bing Maps

Guidance for Coding Data Item #43 (Curves)



Source: TxDOT, Transportation Planning and Programming Division

Guidance for Coding Data Item #52 (Cracking Percent)

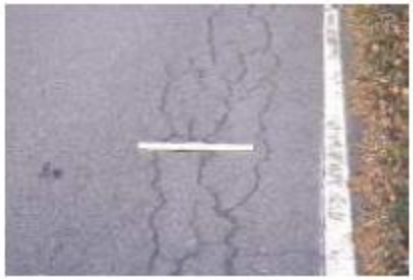
Figure 4.79: AC Chicken Wire/Alligator Fatigue Type Cracking in Wheel path

Source: LTPP Distress and Identification Manual, June 2003

Figure 4.80: AC Low Severity Fatigue Type Cracking

Source: LTPP Distress and Identification Manual, June 2003

Figure 4.81: AC Moderate Severity Fatigue Type Cracking



Source: LTPP Distress and Identification Manual, June 2003

Figure 4.82: AC High Severity Fatigue Type Cracking

Source: LTPP Distress and Identification Manual, June 2003

Table 4.6: HPMS Sample Panel Identification File Structure

	Field Number	Field Name
Sample Panel Section	1	Year of Record
	2	State Code
	3	Route ID
	4	Beginning Milepoint
	5	Ending Milepoint
	6	Section Length
	7	Sample ID

Table 4.7: FHWA Coded Items

	Item Number	Data Item
FHWA Coded Items	1	Climate Zone*
	2	Soil Type*
	3	National Highway System (NHS)**
	4	Future Facility**
	5	STRAHNET**
	6	National Truck Network**

Table 4.8: HPMS Software Calculated Items

	Item Number	Data Item	Extent	
Software Calculated Items	1	Volume Group	FE	
	2	Expansion Factor		SP
	3	Horizontal Alignment Adequacy		SP*
	4	Vertical Alignment Adequacy		SP*
	5	Weighted Design Speed		SP
	6	Peak Capacity		SP
	7	Volume/Service Flow Ratio		
SP = All Sample Panel Sections (as defined by HPMS) SP* = Some Sample Panel Sections, see Data Item details				

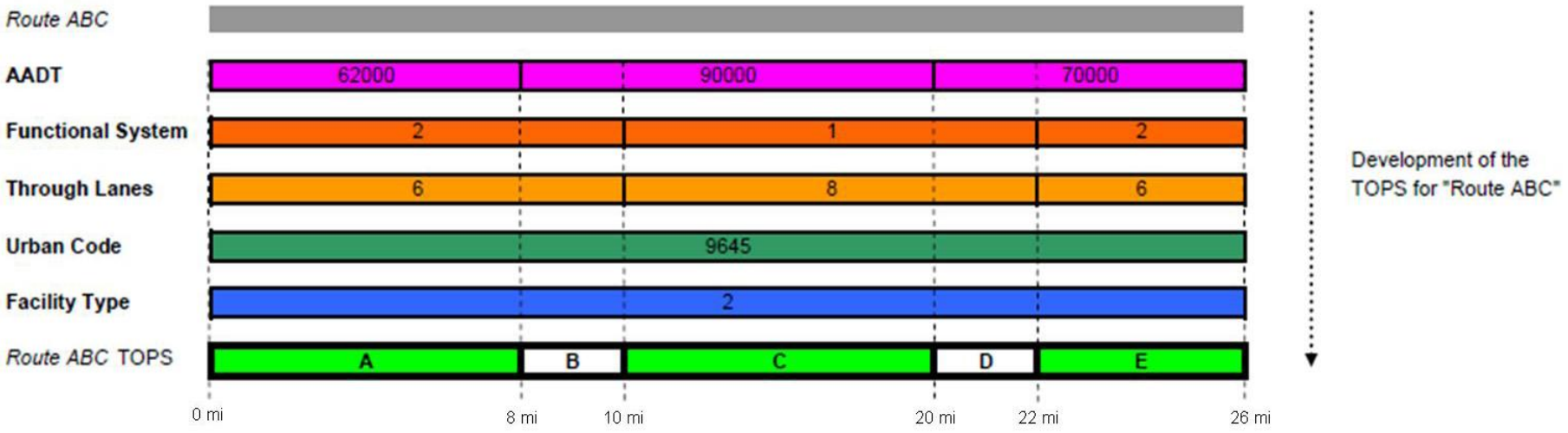
Chapter V: Guidance on Special Topics

- FC System Descriptions and Groupings
- Traffic Monitoring Procedures
- Pavement Data Guidance

Chapter VI: Sampling

- Overview
- Sampling Framework
- New AADT/Volume Group Ranges
- Sample Size Estimation Procedures
- Sample Adequacy and Maintenance

Figure 6.1: TOPS Development Process



Chapter VII: Submittal Process

- Submittal Process Overview
- Submittal Requirements
- Software Validations
- Post-Submittal Expectations

Submittal Process Overview

- Load Routes File
- Load Sections Dataset
- Load Sample Panel ID Dataset
- Load Non-sections Datasets
- Submit

Appendices

- Acronyms / Glossary
- State FIPS Code Table
- Toll ID Table
- HPMS Data Used for Apportionment
- Metric-to-English Soft Conversion Procedures
- Sample View Export Table
- HPMS Crosswalk Table
- Urbanized Area Codes
- County Code Reference Tables (AK, DC, and PR)

Appendix D: Toll ID Table

State FIPS	HPMS Toll ID	Name of Toll Facility
1	1	Alabama River Parkway Bridge
1	2	Black Warrior Parkway Bridge
1	3	Emerald Mountain Expressway Bridge
1	4	Foley Beach Express
2	5	Whittier Tunnel
6	8	San Francisco-Oakland Bay Bridge
6	9	Carquinez Bridge (2 Bridges)
6	10	Martinez-Benicia Bridge
6	11	Richmond-San Rafael Bridge
6	12	Antioch (John A. Nedjedly) Bridge
6	13	San Mateo-Hayward Bridge
6	14	Dumbarton Bridge
6	15	Golden Gate Bridge
6	16	I-15 Value Pricing Project
6	17	Seventeen Mile Drive
6	18	Route 91 Express Lanes
6	19	Eastern Trans. Corridor (Routes 261, 241, & 133)
6	20	Foothill Trans. Corridor (Route 241)
6	21	San Joaquin Hills Trans. Corridor (Route 73)
6	22	SR-7
6	23	SR-125S (San Diego County)
8	24	I-25 HOV/Tolled Express Lanes

Appendix H: HPMS Crosswalk Table

Item No.	Item Name	HPMS 2000 Codes	HPMS 2010+ Codes
1	F_System (Formerly Item #17)	RURAL 1=Principal Arterial-Interstate. 2=Principal Arterial-Other. 6=Minor Arterial. 7=Major Collector. 8=Minor Collector. 9=Local. URBAN 11=Principal Arterial-Interstate. 12=Principal Arterial-Other. Freeways & Expressways. 14=Principal Arterial-Other. 16=Minor Arterial. 17=Collector. 19=Local.	1=Interstate. 2=Principal Arterial-Other. Freeways & Expressways. 3=Principal Arterial-Other. 4=Minor Arterial. 5=Major Collector. 6=Minor Collector. 7=Local.
2	Urban_Code (Formerly Item #13 and #15)	1=Rural (pop. < 5K). 2=Small Urban (pop. 5K to 50K). 3=Small Urbanized (pop. 50K to 200K). 4=Large Urbanized (pop. > 200 K).	99999=Rural. 99998=Small Urban. *Use Census Urban Area Codes for Small and Large Urbanized areas.
3	Facility_Type (Formerly Item #27)	1=One-Way Roadway. 2=Two-Way Roadway. 3=One-Way Structure. 4=Two-Way Structure.	1= One-Way Roadway. 2=Two-Way Roadway. 3=Couplet. 4=Ramp. 5=Non-Mainline. 6=Non-Inventory Direction.

Contents Removed

- Updating LRS Data
- Submittal Software Discussion
- Sample Adequacy Software Discussion
- Donut Area Sampling Procedures
- Estimating Travel for Donut Areas

Training Course Development

- Training Course Materials – June 2010
- Pilot Course – July/August 2010
- Initial Course Offering – Sept. 2010

Special Thanks

- Colorado DOT
- North Carolina DOT
- New York State DOT
- Oregon DOT
- South Carolina DOT
- Texas DOT
- Cambridge Systematics (Contractor)

Questions/Comments

Contact Information

- Ronald Vaughn

  FHWA / Office of Highway Policy Information

  Office: (202) 366-9248

  Email: ronald.vaughn@dot.gov